Equipment & Materials Processing

Shoka Denko restructures

Under its medium-term consolidated business plan (the Sprout Project), Showa Denko K.K. (SDK) has brought together its Electronics Materials and Rare Earth divisions at Chichibu. With this consolidation, SDK aims to strengthen its electronics business by assigning substantial resources to it.

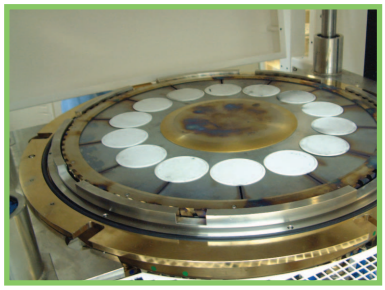
Following the consolidation, the newly formed Electronics Materials Division will improve facility maintenance and TPM (Autonomous Maintenance) activities to enhance production efficiency at Chichibu.

DARPA takes AIN for SUVOS program

DARPA has selected AIN substrate manufacturer Crystal IS Inc to participate in its Semiconductor Ultraviolet Optical Sources (SUVOS) programme.

Dr. Jon Whitlock, CTO at Crystal IS, said: "Single crystal native AIN substrates have the potential to enable the fabrication of high performance deep UV optical sources such as those sought under the SUVOS program." He continued: "Record low dislocation densities, coupled with excellent matches in crystal structure, lattice constant, and thermal expansion coefficient, make native AIN substrates an excellent choice for such applications. Current efforts to improve substrate size and uniformity and to better understand the role of impurities, if successful, bode extremely well for the development of cost-effective sensors based on deep UV optical sources."

EMF, Cree and Saturn



Saturn's 14 x 3" wafer capacity.

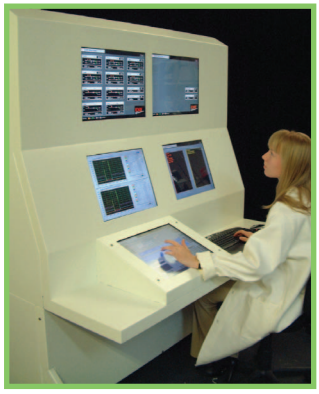
EMF the Cambridge-based epi equipment and specialist chemicals company took its newest, really big, really controlled production machine, Saturn, for its first public airing to the July Conference on Crystal Growth and Epitaxy. This with the workshop on OMVPE and the Laser and NLO Materials symposium was held in Keystone, Colorado.

What may make this US launch more intriguing than many realise is that EMF appears now to have the approval of a quiet, if major player as an interested investor.

Five years ago EMF set up EMF Ireland near Cork, attracted by the tax breaks offered to manufacturing companies. If Saturn were attractive to the compound-manufacturing brigade, Ireland would obviously be a good European site to assemble machines.

In the handwritten Annual Return of 2002 for EMF Ireland (held at Companies' House in Dublin and now searchable on-line), a Durham, NC, holding company sharing Cree's address has taken up 2,469 'O' shares in the Irish company. But both EMF and Cree politely decline to respond. Cree however has expressed considerable interest in SiC recently, acquiring the SiC power patent protfolio of Asea Brown Boveri (ABB Group).

More is to be had then from focusing on Saturn, with a pedigree that originates with the Mercury horizontal cell MOCVD tool for R&D systems



RC2 the closed loop reactor control centre.

but is much more closely based on the second generation Titan, only launched in January this year with its real time control. To produce a machine like Saturn - a big, bold mass production unit, which handles from 2"-4" wafers and works on quantities as high as 14 x 3" wafers, geared for GaN, SiC, AlGaN and InGaAs suggests that more may lie behind the launch than the simple airing of a quickly developed next generation mass production MOCVD tool.

Saturn, with vectored flow epitaxy, boasts that vital feature of real time control. Its reactor control centre allows interactive feedback within the closed loop control. Although obviously most epi systems collect data on production processes and yield, this is historic information, taking time to study and implement. Control and dynamic response to the main changing parameters within the Saturn process, real time abilities must lead to better, optimised yields, ideal for mass production which at present seems only to be demanded from the LED community. Interesting.

Emcore's MOCVD production seminar

This year's International Conference on Nitride Semiconductors (ICNS-5) saw a gathering of GaN experts discussing their work. Representatives from companies and Japanese universities specialising in nitride production attended a series of lectures providing insight into research and commercial developments in GaN processing.

Professor Suzuki, from the Nippon Institute of Technology, focused on GaN FETs, MOCVD growth on 1 degree misoriented sapphire substrates, and the growth of crack-free GaN films on Si substrates, in a technical presentation examining the results achieved using an Emcore D125GaN tool.

Emcore's staff scientist Dr. David Gotthold discussed his work on large area GaN growth, including production development for FETs on 3" (75mm) SiC and 4" (100mm) Si substrates.

Further presentations considered the future market potential for nitride devices and the latest GaN deposition products, including Emcore's Pioneer 75 reactor, a tool specifically designed for research applications.

Emcore is planning future MOCVD seminars in China, Europe, and the US.

Riber's world-tour

After recent sales in Japan and China, reported last issue, Riber continues to find business from all corners of the world.

Russia's Ioffe Physico-Technical Institute has purchased Riber's Compact 21 T MBE system. For use by Dr. Sergey Ivanov's MBE group, the system will grow GaN-based nanostructures for next-generation optical communication and electronic devices.

Mikhael Mizerov, director of the Center for Microelectronics at the Ioffe Institute, said: "After careful evaluation of the different MBE research systems available on the market today, we have decided to select the Riber machine because it perfectly meets our technical requirements for use in fundamental studies of GaN epitaxy process." With this sale, Riber has now supplied a total of six systems to Russian research institutions in recent years.

In Taiwan, the National Cheng Kung University has ordered a Compact 21 S. The mono 2-inch configured system will be used for the research of GaN-based materials for microwave and photonic devices.

Also for nitrides, in Mexico, the Solid State Section of the Physics Department of CINVESTAV (Centro de Investigaticion y de Estudios Avanzados) / Instituto Politecnico Nacional has purchased a Compact 21 S, to be used under the supervision of Dr Maximo Lopez-Lopez. This latest sale marks Riber's fifth system installation in Mexico.

Lastly, the Materials and Nanotechnology Department of the Institut National des Sciences Appliqués in France has ordered a Compact 21 E for the study of quantum nanostructures on InP substrates (e.g. microcavity MQWs). This will be the third Riber system to be installed at the institute.

Veeco and UCSB collaborate

Veeco Instruments Inc and the University of California Santa Barbara (UCSB) are to collaborate, with UCSB transferring MBE growth processes for wireless and optical telecommunication devices to Veeco's epitaxial Process Integration Center (PIC).

The agreement entails UCSB demonstrating growth processes, and providing the PIC scientists with the recipes required to grow non-proprietary versions of: carbon-doped InP HBTs, metamorphic HBTs (InAlGaAs), 980nm edge-emitting lasers, InP/InAlGaAsP 1.5 mm edge-emitting lasers, and 980nm VCSELs.

"We are excited to get these processes and training from one of the world's leading engineering universities," said Dr. Hwa Cheng, Director of the PIC. "These processes were developed at UCSB on our single-wafer GEN II R&D systems, and this agreement will let us duplicate them on the PIC's multi-wafer GEN200 production systems."

Marlin Braun, GM of Veeco MBE operations, said: "High-volume manufacturers of the above-mentioned devices can now receive both a proven tool and process when they select a production MBE system from Veeco." He added: "Since the process is pre-qualified on the PIC GEN200, customers can lower their risk and speed their time to market when their new GEN200 arrives."

Bede wins Taiwanese business

Bede D1 X-ray tool for materials research.

Bede plc has gained orders for its D1 X-ray tool from the Industrial Technology Research Institute (ITRI), Arima Optoelectronics Co (AOC) and the National Chiao Tung University (NCTU), all located in Taiwan.

ITRI's NanoTechnology Research Center (NTRC), opened in January 2003, is a cross-institute research center, developing nanotechnology for industrial applications. Bede's D1 was chosen by NTRC as an X-ray diffraction characterisation tool, for thin-film structure analysis.

AOC, a manufacturer of GaN-based epiwafers for LED and LD applications, has purchased the D1 for detailed film structure analysis. AOC already has a Bede QC200 quality control tool installed on their wafer production line.

Now offering studies in nanomaterials, NCTU chose the D1 for research purposes. It will play an important role in research projects and be available university-wide.

Neil Loxley, CEO of Bede plc said: "These orders with a combined value in excess of $750,000 are further confirmation of a recent improvement seen by Bede in the semiconductor trading environment, with a book to bill for the year to date of 1.9."

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Distributors appointed

Optical Metrology Innovations (OMI), based in Ireland, has appointed Lih Yuan (YMG) as its exclusive distributor for Taiwan, Twinson International (YMG) as its exclusive distributor for China, AXIC as its exclusive distributor for North America and Scitech as its exclusive distributor for Korea.

Each distributor will market OMI's Omistrain, a tool for measuring and diagnosing 3-D thermomechanical deformation and strain related issues in device packages, and Omiprobe, a system using photoreflectance spectroscopy for in-line characterisation of epitaxial wafers.

David Nimmo, OMI's newly appointed VP of sales, said: "These new partnerships give us immediate access to our target customers, a broad geographic coverage and an ability to leverage key customer relationships locally."

MBE Innovator Award

Veeco Instruments Inc, in conjunction with the North American Molecular Beam Epitaxy (NAMBE) and the International MBE organisations, has initiated a $3,000 MBE Innovator Award.

To be presented at the annual meetings of both organisations, the award will recognise individuals that have significantly advanced MBE.

NAMBE is soliciting nominations for the first award, to be presented at the 2003 NAMBE Conference. Nomination forms for the award and complete details can be obtained at: http://www.boulder.nist.gov/div815/nambeweb2.html. The deadline for nominations is August 25, 2003.